CLAIMS

1. A system of networks comprising a plurality of linked intermediate networks (1', 1, 1") for providing an end-to-end connection between a system entry node (I) and a system exit node (E), **characterized in that** each intermediate network is connected to an incoming transit node (2) and an outgoing transit node (3), between which a leg (14) of the end-to-end connection is transported, that the incoming and outgoing transit nodes of an individual intermediary network (1) are connected to links (4, 5) between adjacent intermediary networks (1'-1 and 1-1") , that an end-to-end service node (21) is adapted to select intermediary networks and links which the end-to-end connection shall pass, and to set up connection legs through selected intermediary networks and links, and that transit control nodes (19, 20) are adapted to set up, control and administrate said end-to-end connection over said selected links between intermediary networks, and wherein said entry and exit nodes comprise transit nodes.

2. The system according to claim 1 **characterized in that** said incoming and outgoing transit nodes comprise inward and outward portions (6, 8 and 7,9 respectively), said inward portions (6, 7) comprising functionality for handling of packets according to the networking technology used locally in an intermediary network, and said outward portion comprising functionality for handling link technlolgies.

3. The system according to claim 2 **characterized in that** the incoming transit node has means for converting a package format at its outward portion (8) to the local packet format at said inward portions (6, 7).

4. The system according to claim 2 or 3 **characterized in that** in each intermediary network the incoming transit node has a link tag table (39) and the outgoing transit node has a transit tag table (37) whereby the portion of an end to end connection on a link to an incoming transit node is associated with a locally defined link tag and the leg of an end to end connection across an intermediary network is associated with a locally defined transit tag, and wherein, for an individual end to end connection, the link tag of packets at

the incoming transit node are replaced with a transit tag used for transit of said end to end connection across said individual intermediary network.

5. The system according to claim 4 **characterized in that** said transit tag has been requested by said end to end service node (21) from said outgoing transit node (3) and is transferred to said incoming transit node for storage in a table.

6. The system according to claim 1 **characterized in that** a link between intermediate networks is established by a transit control node (19, 20).

7. The system of claim 4 wherein a source host (A) has at least one access network (1') for access to the entry node (I), and a destination node (B) has at least an access network for access to the exit node (E) **characterized in that** the end-to-end node (21) assigns each individual end-to-end connection a unique identity.

8. The system of claim 7 **characterized in that** said incoming transit node replaces the sender address of an incoming package with an address which is valid in the intermediary network, or if said node is the entry node (I) with a link tag, and replaces the receiver address of said package with the local address of said outgoing transit node in the intermediate network or, if said node is the exit node (E), with the address the destination host (B) has in its access network, said replacements being made separate for each individual packet flow associated with an end-to-end connection.

9. The system of claim 7 **characterized in that** said sender address replacement is made at the entry transit node (I).

10. A method to prepare for transit and to execute transit of packets across a packet switched network comprising a plurality of linked intermediate networks (1´, 1, 1´´), the packets being transited from an entry transit node (I) to an exit transit node (E) both connected to a respective intermediate network **characterized in that**

- the outgoing transit node allocates each separate packet flow a unique transit tag and signals, for each packet flow, said transit tag and its own local address to the incoming transit node thus completing the transit preparation,
- the incoming transit node performs the following steps:

- receives incoming packets and identifies the packet flow to which it belongs,

-moves the payload of each incoming packet that belongs to an identified packet flow into the payload of a new packet formatted in accordance with the technology used internally in the network,

- applies the respective transit tag to each such identified packet

- marks the new packet with said local address of the outgoing transit node as its destination address,

- forwards the new packet to the outgoing transit node using the intermediary network's own internal network technology for routing, and

that the outgoing transit node uses the transit tag applied to each arriving packet to determine to which packet flow the arriving packet belongs, thus completing the transit of packets across the network.

11. A method to prepare for transit and to execute transit of packets along end-to-end connections extending over a plurality of packet switched networks using the method of claim 10 in each of the networks, **characterized in that** the preparation phase comprises the following steps:

- based on connectivity information selecting, for each end-to-end connection, intermediary networks the respective end-to-end connections should pass

- signalling to the outgoing transit nodes in each selected network a request to prepare for the transit of an individual end-to-end connection without identifying the respective end-to-end connection,

- the outgoing transit nodes in each of the selected networks in response to each requested end-to-end connection executing the steps in the preparation phase, and the incoming and outgoing transit nodes in each of the selected networks completing the transit of packets across the respective networks.

12. A method in accordance with claim 11, **characterized in that** in the preparation phase:

- links are selected that the end-to-end connections should traverse between selected intermediary networks, thereby also selecting transit nodes that should be involved in transferring the end-to-end connections from one

selected network to another,

- the transit node sitting at the end of a link that enters a selected network, that is the incoming transit node, allocates each separate packet flow over the respective links a unique link tag and signals, for each packet flow, said link tag to the outgoing transit node of the same respective link, thus completing the transit preparation,

- that for each packet flow and each selected link the corresponding outgoing transit node performs the following steps:

- receives incoming packets and identifies the packet flow to which it belongs,

- applies the respective link tag to each such identified packet, and

- forwards the packets with applied link tags to the incoming transit node at the outgoing end of the link, and

that the incoming transit node uses the link tag applied to each arriving packet to determine to which packet flow the arriving packet belongs, thus completing the transit of packets across the respective link.

13. A method in accordance with claim 11 **characterized in that** an end-to-end service node (i) selects the networks which the end-to-end connection should traverse, and thus the transit nodes that are to be involved, (ii) selects the links that are to be used between the selected networks, (iii) controls the allocation and distribution of transit tags to be used in selected intermediary networks and links, and (iv) coordinates the mapping between link tags and transit tags used in an end-to-end connection.

14. A method in accordance with claims 10 and 11, **characterized in that** links between intermediary networks are administered and setup by transit control nodes that control the allocation and distribution of link tags to be used between the incoming transit node in one intermediary network and the outgoing transit node in the previous network.

15. A method in accordance with claim 12 **characterized in that** separate locally defined sets of transit tags are used at different transit nodes.

16. A method in accordance with claim 12 **characterized in that** a transit tag is associated with a class of service.

17. A method in accordance with claim 12 **characterized in that** a transit tag is associated with a charging attribute.

18. A method in accordance with claim 12 **characterized in that** a transit tag is associated with an admission attribute.

19. A method in accordance with claim 12 **characterized in that** transit tags are cached and subsequently reused for different data flows.

20. A method in accordance with claim 12 **characterized in that** the quality with which an end-to-end connection is transited across a network is supervised by transit nodes, said supervision being provided by adding time stamps, sequence numbers etc. at the incoming transit node of a respective network and validating them versus limit values at the outgoing transit nodes of said network.

21. A method in accordance with claim 20 **characterized in that** an address allocated for fault reporting is inserted in the source address field of the packets, said address pointing to a transit node, transit control node, an end-to-end service node or other node to which faults are reported.

22. A method in accordance with claim 12 **characterized in that**
- the identity of a source host and the identity of a destination host are signalled to the incoming transit node of the last network as seen in the direction of the end-to-end connection at connection set-up, and
- that the original source and destination addresses are removed from the transited packets, thus providing an end-to-end protection of the end-to-end connection.

23. A method in accordance with claim 12 **characterized in that** the outgoing transit node stores information about the incoming transit node from which the packets of each packet flow should arrive, thus providing protection between adjacent networks.

24. A method in accordance with claim 12 **characterized in that** the end-to-end service node and/or the outgoing transit node generates a token which is distributed to the incoming and outgoing transit nodes, that the incoming transit node scrambles the token and inserts it into the packets, that the outgoing transit node receives the packets, de-scrambles the token and

compares it with the original token, and that if they agree the packet is allowed, and that if they do not agree the packet is rejected, thus allowing for protection between adjacent networks.

25. A method in accordance with claim 12 **characterized in that** the end-to-end connection is divided in a departure path extending from a source host to a common joining transit node, and an arrival path extending from the destination host to the joining transit node, wherein the source and destination hosts have agreed upon which transit node should be used as joining transit node as well as upon a transit tag for joining the departure and arrival parts, thereby allowing the destination host to control the route its incoming traffic should follow and the source node to control the route its outgoing traffic shall follow.

26. A method in accordance with the previous claim **characterized in that** any of the destination host and source host requests an alternative path be set up to the joining transit node and that the transit tag agreed upon is used for set up of the alternative path, thus providing mobility to a host.

27. A transit node for transit of an end-to-end connection that extends over a plurality of packet switched networks, an end-to-end connection part that traverses one of the networks being called a leg, said transit node comprising an inward and an outward portion (6 and 8 respectively; 7 and 9 respectively) with functionality for transfer of packets from its outward portion (8) to its inward portion (6) or from its inward portion (7) to its outward portion (9) depending on whether the transit node injects packets into a network to which it is connected, in which case the transit node is called an incoming transit node, or receives packets from a network to which it is connected, in which case the transit node is called an outgoing transit node, **characterized in that** the outgoing transit node comprises a list of transit tags for use in transit of a leg through the network to which it is connected.

28. A transit node in accordance with claim 13, **characterized in that** the incoming transit node comprises a list of incoming identifiers for use in transit of a leg from one network to the next, and functionality for changing an

incoming identifier, included in a packet, to a transit tag associated with the leg through said next network.

29. A transit node in accordance with claim 13, **characterized in that** it does neither comprise any routing protocol, nor forwarding tables generated by a routing protocol.

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